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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,955	02/26/2002	Jason Barnabas Langhorn	CTS-2287	5009
29184	7590	03/25/2005	EXAMINER	
CTS CORPORATION 905 W. BLVD. N ELKHART, IN 46514			GEBREMARIAM, SAMUEL A	
			ART UNIT	PAPER NUMBER
			2811	

DATE MAILED: 03/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/082,955

Applicant(s)

LANGHORN, JASON BARNABAS

Examiner

Samuel A. Gebremariam

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 December 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 25-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 25, 26 and 28 is/are rejected.
- 7) ☒ Claim(s) 27 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. In view of the appeal brief filed on 12/16/2004, PROSECUTION IS HEREBY REOPENED. New ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 25-26 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hinds EP, 1057779A2 in view of Kainuma et al. U.S. patent No. 6,483,190.

Regarding claim 25, Hinds teaches (figs. 2 and 3) a semiconductor package comprising: a planar low temperature co-fired ceramic substrate (12) having a first (22 and 30) and second layer (14) mounted adjacent each other the first layer having a first

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surface (32, refer to fig. 3) and the second layer (14) having a second surface (15) a micro-machined semiconductor device (40) located adjacent the first surface (32), the micro-machined semiconductor device having a plurality of first pads (44, refer to fig. 3) and an active central area (42), a plurality of ball pads (17) located on the second surface, a plurality of second pads (37, refer to fig. 3) located on the first surface (32); a plurality of vias (20, 25 and 27) extending through the substrate (12) between the first and second surfaces, the vias (20, 25 and 27 ) connected to the ball pads (17) and to the first pads (44) a reflowed solder joint (50, col. 4, lines 50-59) located between the first (44) and second pads (37) for electrically connecting the substrate to the semiconductor device (40) the reflowed solder joint formed from a first reflowed solder paste (col. 4, lines 50-57) a solder seal ring (48), located between the micro-machined semiconductor device (40) and the first surface (32) around an outer perimeter (fig. 2 and 3) of the substrate for making a hermetic seal between the micro-machined semiconductor device and the substrate (col. 7, lines 45-48) and plurality of solder spheres (18) mounted to the ball pads by a second reflowed solder paste (46).

Hinds does not explicitly teach a wire bond bump located between the micro-machined semiconductor device and the first surface for supporting the micro-machined semiconductor device during assembly.

However Hinds shows in figures 2 and 3 a structure preventing the micro-machined semiconductor device from contacting the first surface (32). Furthermore the use of wire bump structures is conventional in the art and also taught by Kainuma (fig. 2b) for protecting a silicon chip (101) using bump structures (116, dummy stud bumps).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the dummy bump structures taught by Kainuma in the structure of Hinds in order to further protect the micro-machined semiconductor device.

The limitations of “ultrasonically deposited wire bonds” and “preventing the micro-machined device from contacting the first surface during reflow of solder joint” are considered a product-by-process claim. “[E]ven though product-by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Furthermore the combined structure of Hinds and Kainuma is capable of preventing the micro-machined semiconductor device from contacting the top surface.

Regarding claim 26, Hinds teaches (figs. 2 and 3) substantially the entire claimed structure of claim 25 above including a plurality of circuit lines (34, refer to col. 4, paragraph 0019) located on the first surface (32), the circuit lines connected between vias (20, 25 and 33) and the second pads (37).

Regarding claim 28, Hinds teaches substantially the entire claimed structure of claim 25 above including wire bond bumps that are formed of gold alloy (Kainuma col. 5, lines 19-52).

***Allowable Subject Matter***

4. Claim 27 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Reason for allowance***

5. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not teach or suggest, singularly or in combination at least the limitation of "the substrate does not have a cavity" as recited in claim 27.

***Response to Arguments***

6. Applicant's arguments filed 12/16/04 have been fully considered but they are not persuasive. Applicant argues that none of the cited references show or suggest a rigid support that is used during solder reflow. As stated above the Hinds reference teaches the entire claimed structure of claim 25 above except support structure that is made of a metal for keeping the first surface from contacting the MEMS structure. Kainuma teaches the use of dummy stud bumps (116) that are made of metal for protecting the semiconductor chip region (101a) from touching the upper surface of substrate (120). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the dummy stud bumps made of metal taught by Kainuma in the structure of Hinds in order to further protect the micro-machined semiconductor from contacting the first surface. The limitation that the wire bond bumps prevent the micro-machined semiconductor device from contacting the first surface during reflow of solder joint is not given patentable weight because it is considered a

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product-by-process claim. "[E]ven though product-by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

### **Conclusion**

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel A. Gebremariam whose telephone number is (571)-272-1653. The examiner can normally be reached on 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAG  
March 9, 2005



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